

# PATENT ABSTRACTS OF JAPAN

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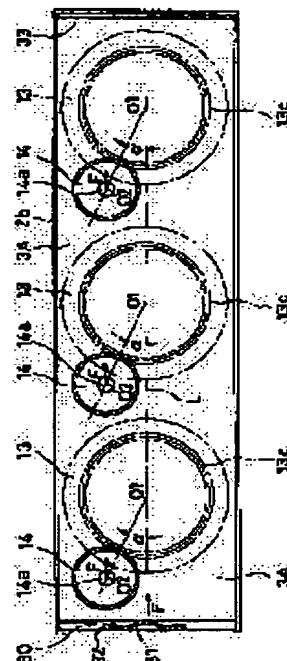
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## (54) CONTROL PANEL

### (57)Abstract:

**PROBLEM TO BE SOLVED:** To provide a control panel with plural switch mechanisms with secured inner space, and to facilitate mounting of the switch mechanisms.

**SOLUTION:** In the control panel with plural switch mechanisms, the engagement position of a drive gear and an operation gear of each switch mechanism is set nearly in the same direction from the center of the drive gear of each switch mechanism. The control panel also has an energizing means for energizing a printed board with a rotary switch, to which the operation gear is fixed, toward the drive gear. The operation gears are mounted so that the extension line connecting the centers of the plural drive gears and the extension line connecting the center of each drive gear and the center of the corresponding operation gear cross each other at a prescribed angle.



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**CLAIMS**

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**[Claim(s)]**

[Claim 1] The cylindrical fixed part which has the end fixed on the printed circuit board by which an electrical circuit is wired, forms predetermined space inside, and secures a predetermined field on said printed circuit board, The dial section by which the periphery of this cylindrical fixed part was equipped free [ rotation ], and the driver was formed in the periphery side face, In the control panel which has two or more switch mechanisms possessing the differential gear which meshes in the gearing section of this dial section, and the rotation position sensor which detects the rotation location while rotating through this differential gear While setting up the engagement location of said driver of each switch mechanism, and said differential gear in the abbreviation same direction to the core of each driver The control panel characterized by providing an energization means to energize said printed circuit board to which the rotation position sensor which said differential gear fixes was fixed to said drive gear-tooth car side.

[Claim 2] The production which connects the production which connects the core of two or more of said drivers, and the core of each of said driver and the core of the differential gear corresponding to each driver is a control panel according to claim 1 characterized by having a predetermined include angle and crossing.

[Claim 3] Said energization means is a control panel according to claim 1 or 2 characterized by being the case where said printed circuit board is contained, and the flat spring prepared between said printed circuit boards.

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**DETAILED DESCRIPTION**

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**[Detailed Description of the Invention]****[0001]**

[The technical field to which invention belongs] This invention relates to the control panel which consists of two or more switch mechanisms which set up control of the air conditioner carried in a car.

**[0002]**

[Description of the Prior Art] The rotary switch possessing the switch substrate with which JP,9-288934,A has two or more switch contacts as a conventional rotary switch, the elastic press plate which holds the contact section which has two or more arm section and was prepared in each arm section on said switch contact, and the body of revolution which prepared the depression section which is arranged free [ rotation on said switch substrate ], and depresses said arm section in contact with said arm section on the inferior surface of tongue is indicated.

**[0003]**

[The technical problem which invention will solve and to carry out] However, since a push switch and the light source for a display are allotted on the printed circuit board in which the contact surface of this rotary switch is prepared, the rotary switch used for the air conditioner for cars will need to secure a tooth space. When the rotary switch of a quotation mentioned above is used at this point, and since the occupancy area which a contact surface occupies on a printed circuit board in the rotary switch of a quotation is large, it will be necessary to prepare the light source of a push switch or a display in the outside of a rotary switch. Moreover, since the knob of a rotary switch has fixed to the contact surface, adjustment of the location of the knob hole formed in the control panel and the knob fixed to the printed circuit board is difficult for it, and a problem produces it to the wearing nature of a printed circuit board.

[0004] Therefore, the invention in this application offers the control panel which raised the wearing nature of a switch mechanism while having two or more switch mechanisms which secured the tooth space in the interior.

**[0005]**

[Means for Solving the Problem] Therefore, the cylindrical fixed part which this invention has the end fixed on the printed circuit board by which an electrical circuit is wired, forms predetermined space inside, and secures a predetermined field on said printed circuit board, The dial section by which the periphery of this cylindrical fixed part was equipped free [ rotation ], and the driver was formed in the periphery side face, In the control panel which has two or more switch mechanisms possessing the differential gear which meshes in the gearing section of this dial section, and the rotation position sensor which detects the rotation location while rotating through this differential gear While setting up the engagement location of said driver of each switch mechanism, and said differential gear in the abbreviation same direction to the core of each driver It is in having provided an energization means to energize said printed circuit board to which the rotation position sensor which said differential gear fixes was fixed to said drive gear-tooth car side.

[0006] According to this invention, therefore, the engagement location of said driver of each

switch mechanism, and said differential gear Since an energization means to energize said printed circuit board to which the rotary switch which sets up in the abbreviation same direction to the core of each driver, and said differential gear fixes was fixed to said drive gear-tooth car side was established Since a differential gear is pressed by the driver and it gears only by equipping a case with a printed circuit board, wearing of the differential gear for which dimensional accuracy is needed most and driver of a switch mechanism can be simplified, and the backlash of gears and a gap can be prevented further.

[0007] Moreover, as for the production which connects the production which connects the core of two or more of said drivers, and the core of each of said driver and the core of the differential gear corresponding to each driver, it is desirable to have a predetermined include angle and to cross. Since a differential gear has a gap of a predetermined include angle and will mesh to a driver by this when a printed circuit board is pressed by the one direction with an energization means, each gearing's Yamabe dies [ contacting and locking or ] and they can gear each gearing certainly.

[0008] Moreover, as for said energization means, it is desirable that they are the case where said printed circuit board is contained, and the flat spring prepared between said printed circuit boards. Thereby, an energization means can be manufactured cheaply.

[0009]

[Embodiment of the Invention] Hereafter, a drawing explains the gestalt of implementation of this invention.

[0010] It is for setting up control of the air conditioner carried in the car which is not illustrated, and the control panel 1 shown in drawing 1 and drawing 2 has the case 2 which consists of front case 2a, inside case 2b, and flesh-side case 2c. A printed circuit board is constituted by 1st printed circuit board 3A held at said inside case 2b, and 2nd printed circuit board 3B by which maintenance immobilization is carried out between said inside case 2b and said flesh-side case 2c.

[0011] The cylindrical extension section 4 of plurality (the gestalt of this operation three) which extends from the circular opening 7 formed in said table case 2a is formed in the opposite side at said inside case 2b the side by which adhesion immobilization of the 1st printed circuit board 3A is carried out. Near the periphery edge of this cylindrical extension \*\*\*\* 4, claw part 4a which projects in the direction of a path is formed in the position of a circumferential direction. The interior member 5 of cylindrical which abbreviation's is in the bore of this cylindrical extension section 4 by carrying out, and has an outer diameter was inserted in each of this cylindrical extension section 4, stop section 5a formed in the end of this interior member 5 of a cylinder was fixed to said inside case 2b, and through tube 3a formed in said 1st printed circuit board 3A is penetrated. Moreover, said interior member 5 of cylindrical secures the predetermined field 6 on said 1st printed circuit board 3A.

[0012] On printed circuit board 3A in said field 6, when a push switch 8 is allotted, the shaft orientations of this interior member 5 of cylindrical are equipped with the push member 9 to which an end contacts the push part of this push switch 8 corresponding to this push switch 8 movable at said interior member of cylindrical 5 interior. Moreover, when a display 10 is formed in the other end side of said interior member 5 of cylindrical, the lead lamp (the gestalt of this operation light emitting diode) 11 is formed in said field 6 if needed. Moreover, display 9a is prepared also in said push member 9, and the injection condition of a switch is shown or the light may be made to switch on so that the location of a switch may be shown at the time of light lighting of Nighttime.

[0013] Moreover, it is equipped with the mechanical component 13 which gears to the dial knob 12 in the periphery side face around said cylindrical extension section 4, and rotates with the dial knob 12 free [ rotation ]. This mechanical component 13 is constituted by dial knob applied part 13a which has piece of engagement 13b which gears to said dial knob 12, and mechanical-component 13c by which the gear tooth of a predetermined number was formed in the peripheral face while the periphery side face of said cylindrical extension section 4 was equipped free [ rotation ]. Moreover, lighting display 12a which displays a rotation location is prepared in the dial knob 12.

[0014] Furthermore, near the outside of said mechanical component 13, the differential gear 14 which has the gear tooth of the predetermined number which gears to driver 13c of said mechanical component 13 is formed. Moreover, revolving-shaft 14a of this differential gear 14 fixes to revolving-shaft 15a of the rotary switch 15 as a rotation position sensor which fixed to said 1st printed circuit board 3A.

[0015] The cylindrical fixed part which consists of the cylindrical extension section 4 and an interior member 5 of cylindrical with the gestalt of this operation as described above, The dial section which consists of a dial knob 12 and a mechanical component 13, and the differential gear 14 which meshes to driver 13c of said mechanical component 13, The switch mechanism 20 (20a, 20b, 20c) which consists of a rotary switch 15 is constituted, and three switch mechanisms 20 (20a, 20b, 20c) are formed in the control panel 1 concerning the gestalt of operation of the invention in this application.

[0016] Moreover, in the control panel 1 concerning the gestalt of operation of this invention, if it says to the abbreviation same direction and a pan concretely to each corresponding driver 13, each differential gear 14 will have the predetermined include angle  $\alpha$  in drawing 3 to the longitudinal shaft orientations of 1st printed circuit board 3A, and will be arranged on it in the same direction, so that it may be shown. In other words, the line which connected the core O1 of each driver 13 and the core O2 of said differential gear 14 corresponding to each driver 13 crosses at an angle of  $[\alpha]$  predetermined to the extension stem line L which connected each core O1 of said driver 15 which extends to said longitudinal shaft orientations.

[0017] Moreover, said 1st printed circuit board 3A is energized by the energization section 30 which the other end becomes from flat spring 31 and the flat spring attaching part 32 at said wearing slot 33 side while the wearing slot 33 formed in said inside case 2b is equipped with the end of said longitudinal shaft orientations.

[0018] By this, since 1st printed circuit board 3A is energized by the energization section 30 in the direction of F, a differential gear 14 is pressed in the direction of F to a driver 13, and meshes. When a differential gear 14 is completely located in longitudinal shaft orientations at this time, it is also assumed that Yamabe of a differential gear 14 and Yamabe of a driver 13 collide, and a differential gear 14 and a driver 12 do not mesh, but since the migration direction of the differential gear 14 by the energization section 30 is slanting to the engagement location of a differential gear 14 and a driver 13, engagement of a differential gear 14 and a driver 13 can be ensured.

[0019]

[Effect of the Invention] As explained above, while setting up the engagement location of said driver of each switch mechanism, and said differential gear in the abbreviation same direction to the core of each driver according to this invention Since said printed circuit board to which the rotary switch which said differential gear fixes was fixed by the energization means was energized to said drive gear-tooth car side In order for a differential gear to be pressed by the driver and to gear only by equipping a case with a printed circuit board, wearing of the differential gear and driver for which dimensional accuracy is most needed among installation of a switch mechanism can be simplified. Moreover, since one gearing is pressed to the gearing of another side, gearings' backlash and a gap can be prevented.

[0020] Moreover, since it has a predetermined include angle and was made to cross, the production which connects the production which connects the core of two or more of said drivers, and the core of each of said driver and the core of the differential gear corresponding to each driver Since a differential gear has a gap of a predetermined include angle and will mesh to a driver when a printed circuit board is pressed by the one direction with an energization means, each gearing's Yamabe dies [ contacting and locking or ] and they can gear each gearing certainly.

[0021] Moreover, since said energization means was formed by the case where said printed circuit board is contained, and the flat spring prepared between said printed circuit boards, an energization means can be manufactured cheaply and a cost cut can be attained.

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**DESCRIPTION OF DRAWINGS**

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[Brief Description of the Drawings]

[Drawing 1] It is the decomposition perspective view of the control panel concerning the gestalt of operation of the invention in this application.

[Drawing 2] It is the sectional view of the control panel concerning the gestalt of operation of the invention in this application.

[Drawing 3] It is the explanatory view having shown the relation of the driver and differential gear concerning the gestalt of operation of the invention in this application.

[Description of Notations]

1 Control Panel

3 Printed Circuit Board

3A The 1st printed circuit board

3B The 2nd printed circuit board

13 Driver

14 Differential Gear

15 Rotary Switch

20 Switch Mechanism

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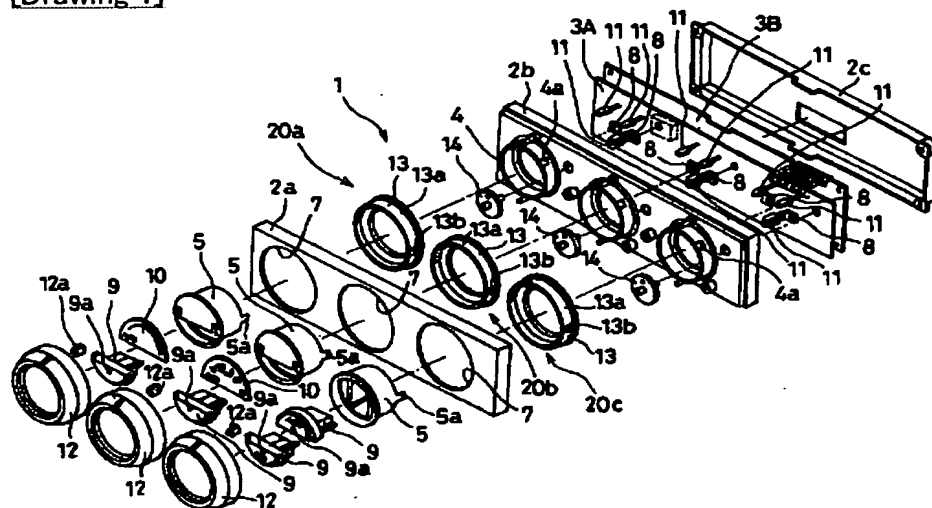
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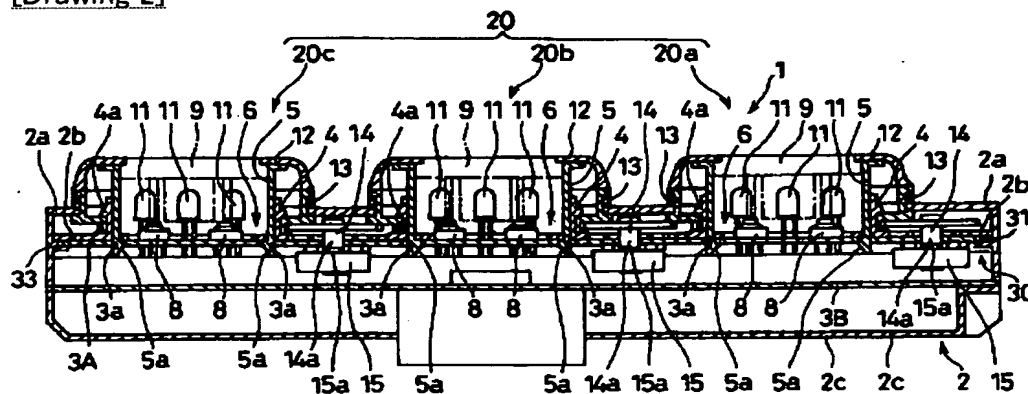
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## DRAWINGS

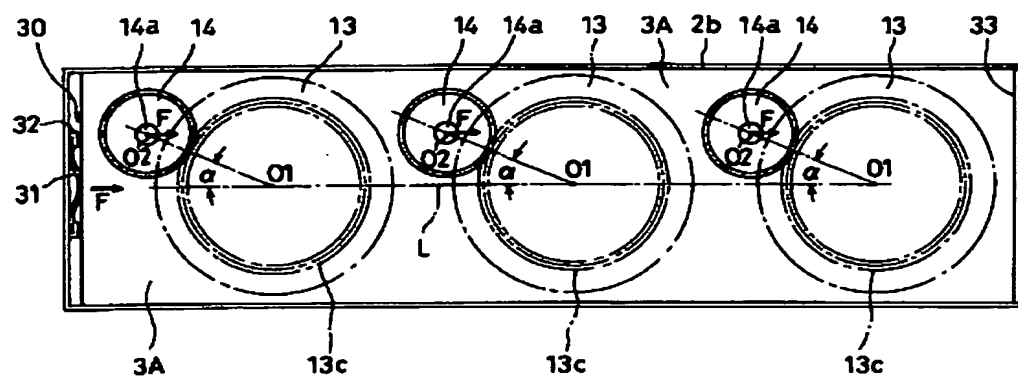
[Drawing 1]



[Drawing 2]



[Drawing 3]



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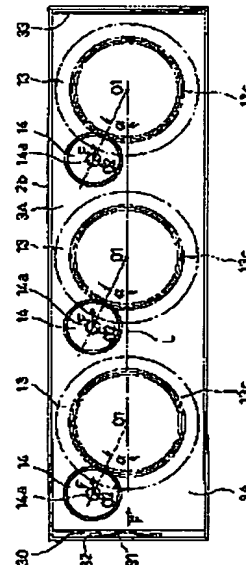
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		Fターム(参考)	5G019 C101 C151 S101 5G052 A402 A435 H004 H010

(54) 【発明の名称】 操作パネル

## (57) 【要約】

【課題】 内部にスペースを確保したスイッチ機構を複数有すると共に、スイッチ機構の装着性を向上させる。

【解決手段】 複数のスイッチ機構を有する操作パネルにおいて、それぞれのスイッチ機構の前記駆動歯車と前記作動歯車の噛合位置を、それぞれの駆動歯車の中心に対して略同一方向に設定し、前記作動歯車が固着される回転式スイッチが固定された前記プリント基板を前記駆動歯車側に付勢する付勢手段を設ける。また、複数の前記駆動歯車の中心を接続する延長線と、前記それぞれの駆動歯車の中心とそれぞれの駆動歯車に対応する作動歯車の中心とを接続する延長線とが所定の角度を有して交差するように作動歯車を設ける。



(2)

特開2001-229780

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【特許請求の範囲】

【請求項1】 電気回路が配線されるプリント基板上に固定される一端を有し、内部に所定の空間を形成して前記プリント基板上に所定の領域を確保する円筒状固定部と、該円筒状固定部の外周に回転自在に装着され、駆動歯車が外周側面に形成されたダイヤル部と、該ダイヤル部の歯車部に啮合する作動歯車と、該作動歯車を介して回転すると共にその回転位置を検出する回転位置検出器とを具備するスイッチ機構を複数有する操作パネルにおいて、

それぞれのスイッチ機構の前記駆動歯車と前記作動歯車の啮合位置を、それぞれの駆動歯車の中心に対して略同一方向に設定すると共に、前記作動歯車が固着される回転位置検出器が固定された前記プリント基板を、前記駆動歯車側に付勢する付勢手段を具備したことを特徴とする操作パネル。

【請求項2】 複数の前記駆動歯車の中心を接続する延長線と、前記それぞれの駆動歯車の中心とそれぞれの駆動歯車に対応する作動歯車の中心とを連絡する延長線とは、所定の角度を有して交差することを特徴とする請求項1記載の操作パネル。

【請求項3】 前記付勢手段は、前記プリント基板が収納されるケースと前記プリント基板の間に設けられた板ばねであることを特徴とする請求項1又は2記載の操作パネル。

【発明の詳細な説明】

【0001】

【発明が属する技術分野】この発明は、車両に搭載される空調装置の制御を設定する複数のスイッチ機構からなる操作パネルに関する。

【0002】

【従来の技術】従来の回転式スイッチとして、特開平9-288934号公報は、複数のスイッチ接点を有するスイッチ基板と、複数のアーム部を有し各アーム部に設けた当接部を前記スイッチ接点上に保持する弾性押圧板と、前記スイッチ基板上に回転自在に配置されその下面に前記アーム部に当接して前記アーム部を押し下げる押し下げ部を設けた回転体とを具備する回転式スイッチを開示する。

【0003】

【発明が解決しようする課題】しかしながら、車両用空調装置に使用される回転スイッチは、この回転スイッチの接点部が設けられるプリント基板上にブッシュスイッチや表示用の光器が配されることから、スペースを確保する必要が生じる。この点で、上述した引例の回転スイッチを使用した場合、また、引例の回転式スイッチにおいては、接点部がプリント基板上に占める占有面積が大きいことから、ブッシュスイッチや表示部の光器を回転スイッチの外側に設ける必要が生じる。また、回転式スイッチのノブは接点部に固着されているので、操作パネ

ルに形成されたノブ穴と、プリント基板上に固定されたノブとの位置の整合が難しく、プリント基板の装着性に問題が生じる。

【0004】そのため、本発明は、内部にスペースを確保したスイッチ機構を複数有すると共に、スイッチ機構の装着性を向上させた操作パネルを提供するものである。

【0005】

【課題を解決するための手段】よって、この発明は、電気回路が配線されるプリント基板上に固定される一端を有し、内部に所定の空間を形成して前記プリント基板上に所定の領域を確保する円筒状固定部と、該円筒状固定部の外周に回転自在に装着され、駆動歯車が外周側面に形成されたダイヤル部と、該ダイヤル部の歯車部に啮合する作動歯車と、該作動歯車を介して回転すると共にその回転位置を検出する回転位置検出器とを具備するスイッチ機構を複数有する操作パネルにおいて、それぞれのスイッチ機構の前記駆動歯車と前記作動歯車の啮合位置を、それぞれの駆動歯車の中心に対して略同一方向に設定すると共に、前記作動歯車が固着される回転位置検出器が固定された前記プリント基板を、前記駆動歯車側に付勢する付勢手段を具備したことにある。

【0006】したがって、この発明によれば、それぞれのスイッチ機構の前記駆動歯車と前記作動歯車の啮合位置を、それぞれの駆動歯車の中心に対して略同一方向に設定し、前記作動歯車が固着される回転式スイッチが固定された前記プリント基板を前記駆動歯車側に付勢する付勢手段を設けたので、プリント基板をケースに装着するだけで作動歯車が駆動歯車に押圧されて啮合することから、スイッチ機構の最も寸法精度が必要とされる作動歯車と駆動歯車の装着を簡略化することができ、さらにギア同士のガタやずれを防止できるものである。

【0007】また、複数の前記駆動歯車の中心を接続する延長線と、前記それぞれの駆動歯車の中心とそれぞれの駆動歯車に対応する作動歯車の中心とを連絡する延長線とは、所定の角度を有して交差することが望ましい。これによって、プリント基板が付勢手段によって一方に押圧された場合、作動歯車が駆動歯車に対して所定の角度のずれを有して啮合することとなるため、それぞれの歯車の山部同士が当接してロックすることなくなり、それぞれの歯車を確実に啮合できるものである。

【0008】また、前記付勢手段は、前記プリント基板が収納されるケースと前記プリント基板の間に設けられた板ばねであることが望ましい。これにより、付勢手段を安価に製造できる。

【0009】

【発明の実施の形態】以下、この発明の実施の形態について図面により説明する。

【0010】図1及び図2において示される操作パネル1は、例えば図示しない車両に搭載される空調装置の制

(3)

特開2001-229780

3

4

図の設定を行なうためのもので、表ケース2 a、中ケース2 b及び裏ケース2 cからなるケース2を有する。プリント基板は、前記中ケース2 bに保持される第1のプリント基板3 Aと、前記中ケース2 bと前記裏ケース2 cの間に保持固定される第2のプリント基板3 Bとによって構成される。

【0011】前記中ケース2 bには、第1のプリント基板3 Aが密着固定される側と反対側に、前記表ケース2 aに形成された円形開口部7から延出する複数（この実施の形態では3つ）の円筒状延出部4が形成される。この円筒状延出部4の外周端部近傍には円筒方向の所定の位置に径方向に突出する爪部4 aが形成される。この円筒状延出部4の各々には、この円筒状延出部4の内径に略等しい外径を有する円筒状内部部材5が挿入され、この円筒状内部部材5の一端に形成された係止部5 aが前記中ケース2 bに固定され、前記第1のプリント基板3 Aに形成された貫通孔3 aを貫通している。また、前記円筒状内部部材5は、前記第1のプリント基板3 A上に所定の領域6を確保する。

【0012】前記領域6内のプリント基板3 A上に、例えばブッシュスイッチ8が配された場合には、このブッシュスイッチ8に対応して一端がこのブッシュスイッチ8のブッシュ部分に当接するブッシュ部材9が、前記円筒状内部部材5内部に、この円筒状内部部材5の軸方向に移動可能に装着される。また、前記円筒状内部部材5の他端側に表示部10が設けられる場合には、必要に応じて前記領域6内にリードランプ（この実施の形態では発光ダイオード）11が設けられる。また、前記ブッシュ部材9にも表示部9 aを設けて、スイッチの投入状態を示すようにしたり、夜間のライト点灯時にスイッチの場所を示すように点灯させても良いものである。

【0013】また、前記円筒状延出部4の周囲の外周側面にはダイヤルノブ12に啮合してダイヤルノブ12と共に回転する駆動部13が回転自在に装着される。この駆動部13は、前記ダイヤルノブ12に啮合する啮合片13 bを有するダイヤルノブ装着部13 aと、前記円筒状延出部4の外周側面に回転自在に装着されると共に、外周面に所定数の歯が形成された駆動部13 cとによって構成される。また、ダイヤルノブ12には、回転位置を表示する点灯表示部12 aが設けられている。

【0014】さらに、前記駆動部13の外側近傍には、前記駆動部13の駆動歯車13 cに啮合する所定数の歯を有する作動歯車14が設けられる。また、この作動歯車14の回転軸14 aは、前記第1のプリント基板3 Aに固着された回転位置検出器としての回転式スイッチ15の回転軸15 aに固着されるものである。

【0015】上記したように、本実施の形態では、円筒状延出部4及び円筒状内部部材5からなる円筒状固定部と、ダイヤルノブ12及び駆動部13からなるダイヤル部と、前記駆動部13の駆動歯車13 cに啮合する作動

歯車14と、回転式スイッチ15からなるスイッチ機構20（20 a、20 b、20 c）が構成され、本願発明の実施の形態に係る操作パネル1には3つのスイッチ機構20（20 a、20 b、20 c）が形成されるものである。

【0016】また、本発明の実施の形態に係る操作パネル1において、図3に示すように、各々の作動歯車14は、対応する各々の駆動歯車13に対して略同一方向、さらに具体的に言えば、第1のプリント基板3 Aの長手軸方向に対して所定の角度 $\alpha$ を有して同一方向に配される。言い換えれば、前記長手軸方向に延出する前記駆動歯車15の各々の中心O1を結んだ延長軸線Lに対して、それぞれの駆動歯車13の中心O1とそれぞれの駆動歯車13に対応する前記作動歯車14の中心O2を結んだ線は、所定の角度 $\alpha$ で交差している。

【0017】また、前記第1のプリント基板3 Aは、前記長手軸方向の一端が前記中ケース2 bに形成された装着溝部33に装着されると共に、他端が板ばね31及び板ばね保持部32からなる付勢部30によって前記装着溝部33側に付勢される。

【0018】これによって、作動歯車14は、第1のプリント基板3 Aが付勢部30によってF方向に付勢されることから、駆動歯車13に対してF方向に押圧され啮合する。このとき、作動歯車14が完全に長手軸方向に位置した場合には、作動歯車14の山部と駆動歯車13の山部とが衝突して作動歯車14と駆動歯車12が啮合しないことも想定されるが、付勢部30による作動歯車14の移動方向が作動歯車14と駆動歯車13の啮合位置に対して斜めになっているため、作動歯車14と駆動歯車13の啮合を確実に行うことができるものである。

【0019】

【発明の効果】以上説明したように、この発明によれば、それぞれのスイッチ機構の前記駆動歯車と前記作動歯車の啮合位置を、それぞれの駆動歯車の中心に対して略同一方向に設定すると共に、付勢手段により、前記作動歯車が固着される回転式スイッチが固定された前記プリント基板を前記駆動歯車側に付勢するようにしたので、プリント基板をケースに装着するだけで作動歯車が駆動歯車に押圧されて啮合するようになるため、スイッチ機構の取り付け作業の内最も寸法精度が必要とされる作動歯車と駆動歯車の装着を簡略化することができる。また、一方の歯車が他方の歯車に対して押圧されることから、歯車同士のカタやずれを防止することができるものである。

【0020】また、複数の前記駆動歯車の中心を接続する延長線と、前記それぞれの駆動歯車の中心とそれぞれの駆動歯車に対応する作動歯車の中心とを接続する延長線とを、所定の角度を有して交差するようにしたので、プリント基板が付勢手段によって一方向に押圧された場合、作動歯車が駆動歯車に対して所定の角度のずれを有

(4)

特開2001-229780

5

6

して噛合することとなるため、それぞれの歯車の山部同士が当接してロックすることなくなり、それぞれの歯車を回転に噛合できるものである。

【0021】また、前記付勢手段を、前記プリント基板が収納されるケースと前記プリント基板の間に設けられた板ばねによって形成したので、付勢手段を安価に製造でき、コストダウンを達成できる。

【図面の簡単な説明】

【図1】本願発明の実施の形態に係る操作パネルの分解斜視図である。

【図2】本願発明の実施の形態に係る操作パネルの断面図である。

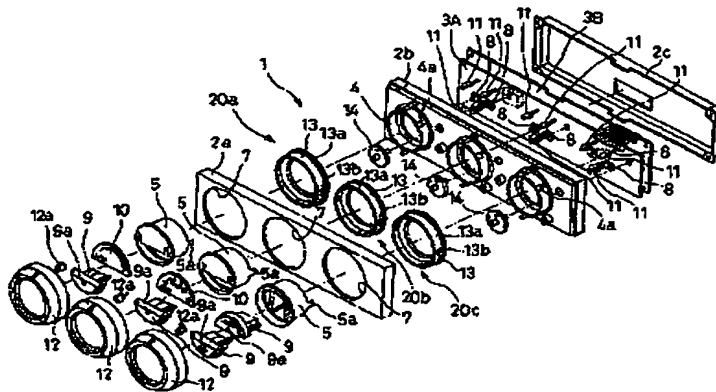
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\*【図3】本願発明の実施の形態に係る駆動歯車と作動歯車の関係を示した説明図である。

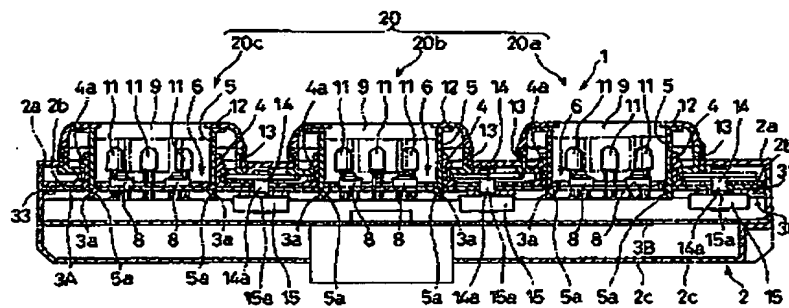
【符号の説明】

- 1 操作パネル
- 3 プリント基板
- 3A 第1のプリント基板
- 3B 第2のプリント基板
- 13 駆動歯車
- 14 作動歯車
- 10 15 回転式スイッチ
- 20 スイッチ機構

【図1】



【図2】



(5)

特開2001-229780

【図3】

